

The demand must be filed directly with the competent International Preliminary Examining Authority. If two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ \_\_\_\_\_

# PCT

## CHAPTER II

### DEMAND

under Article 31 of the Patent Cooperation Treaty:  
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

30 SEP 2004

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
<b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>	
Applicant's or agent's file reference BP105724	
International application No. PCT/FI03/00251	International filing date (day/month/year) 1 April 2003 (01.04.03)
(Earliest) Priority date (day/month/year) 2 April 2002 (02.04.02)	
Title of invention A photocatalyst containing titanium oxide, the production method and use of the same	
<b>Box No. II APPLICANT(S)</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
KEMIRA PIGMENTS OY Porkkalankatu 3 FIN-00180 Helsinki Finland	
Telephone No.	
Facsimile No.	
Teleprinter No.	
Applicant's registration No. with the Office	
State (that is, country) of nationality: Finland	State (that is, country) of residence: Finland
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
KARVINEN, Salla Kuusamantie 37 FIN-28660 Pori Finland	
State (that is, country) of nationality: Finland	State (that is, country) of residence: Finland
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
LAMMINMÄKI, Ralf-Johan Pajatie 5 FIN-28450 Ulvila Finland	
State (that is, country) of nationality: Finland	State (that is, country) of residence: Finland
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.	

**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*BERGGREN OY AB  
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☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:\***

1. The applicant wishes the international preliminary examination to start on the basis of:

☐ the international application as originally filedthe description ☒ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☒ as amended under Article 34the drawings ☒ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

**Language for the purposes of international preliminary examination: English**☐ which is the language in which the international application was filed.☒ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

**Box No. VI CHECK LIST**

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- |  |   |       |        |
|--|---|-------|--------|
| 1. translation of international application                              | : | _____ | sheets |
| 2. amendments under Article 34   | : | 2     | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | _____ | sheets |
| 4. copy (or, where required, translation) of statement under Article 19  | : | _____ | sheets |
| 5. letter  | : | 1     | sheets |
| 6. other ( <i>specify</i> )  | : | _____ | sheets |

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received	not received
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

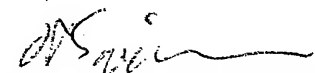
The demand is also accompanied by the item(s) marked below:

- |  |   |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet                             | 5. <input type="checkbox"/> statement explaining lack of signature                        |
| 2. <input type="checkbox"/> original separate power of attorney                          | 6. <input type="checkbox"/> sequence listings in computer readable form                   |
| 3. <input type="checkbox"/> original general power of attorney                           | 7. <input type="checkbox"/> tables in computer readable form related to sequence listings |
| 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 8. <input type="checkbox"/> other ( <i>specify</i> ):                                     |

**Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

BERGGREN OY AB



Olli-Pekka SAIJONMAA  
Patent Attorney

Helsinki, 17 October 2003

**For International Preliminary Examining Authority use only**

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

**For International Bureau use only**

Demand received from IPEA on:

## PCT

## FEE CALCULATION SHEET

## Annex to the Demand

International application No. <b>PCT/FI03/00251</b>	For International Preliminary Examining Authority use only
Applicant's or agent's file reference <b>BP105724</b>	Date stamp of the IPEA
Applicant <b>Kemira Pigments Oy</b>	
<b>CALCULATION OF PRESCRIBED FEES</b>	
1. Preliminary examination fee .....	<div style="border: 1px solid black; padding: 2px;">SEK 5000</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">P</div>
2. Handling fee ( <i>Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.</i> ) .....	<div style="border: 1px solid black; padding: 2px;">SEK 1410</div> <div style="border: 1px solid black; padding: 2px; width: 20px; text-align: center;">H</div>
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box .....	<div style="border: 1px solid black; padding: 2px;">SEK 6410</div> <div style="border: 1px solid black; padding: 2px;">TOTAL</div>
<b>MODE OF PAYMENT</b>	
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash
<input type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons
<input type="checkbox"/> bank draft	<input checked="" type="checkbox"/> other (specify): <b>BANK TRANSFER</b>
<b>AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT</b> <i>(This mode of payment may not be available at all IPEAs)</i>	
<input type="checkbox"/> Authorization to charge the total fees indicated above.	IPEA/ _____
<input type="checkbox"/> <i>(This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	Deposit Account No.: _____
	Date: _____
	Name: _____
	Signature: _____

## Claims

1. A method for preparing a photocatalyst containing titanium dioxide, **characterised** in that from an acid solution containing titanium oxysulphate at a temperature under the boiling point of the solution is precipitated by addition of crystal nuclei a sulphurous titanium dioxide hydrate precipitate, said precipitate being separated and subsequently subjected to thermal treatment in order to obtain a crystalline product with a sulphur content of 1 to 5 %.
2. A method as defined in claim 1, **characterised** in that the precipitation is conducted without addition of base.
3. A method as defined in claim 1 or 2, **characterised** in that the precipitation is conducted in a temperature range from 70 to 100 °C.
4. A method as defined in claim 3, **characterised** in that the crystal nuclei are anatase.
5. A method as defined in any of the preceding claims, **characterised** in that the precipitate separated from the solution is calcinated in air in the temperature range from 100 to 500 °C, preferably 200 to 500 °C.
6. A method as defined in any of the preceding claims, **characterised** in that the solution containing titanium oxysulphate is obtained by reacting ilmenite and sulphuric acid, by dissolving the sulphate thus formed and by removing at least part of the iron from the solution by reduction into ferrous form and crystallisation.
7. A method as defined in claim 6, **characterised** in that ferric iron is left in the solution, so that the titanium dioxide hydrate precipitate obtained contains iron.
8. A method as defined in any of the preceding claims, **characterised** in that a chromium(III) compound is added to the precipitate before the thermal treatment.
9. A method as defined in any of the preceding claims, **characterised** in that an iron compound is added to the precipitate before the thermal treatment.

10. A photocatalyst obtained by a method according to any of the preceding claims, the photocatalyst containing titanium dioxide, **characterised** in that the crystalline particulate product has a specific surface area in the range from 100 to 250 m<sup>2</sup>/g and that the product contains 1 to 5%, preferably 1 to 4% of sulphur.

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11. A photocatalyst as defined in claim 10, **characterised** in that the major portion of titanium dioxide is in anatase form.

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12. A photocatalyst as defined in claim 10 or 11, **characterised** in that the product contains 0.05 to 2% of chromium, preferably 0.1 to 1%, and 0.05 to 0.3% of iron, preferably 0.1 to 1.5%.

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13. Use of the titanium dioxide prepared as in any of claims 1 to 9 as a photocatalyst operating at visible light wavelengths.

14. Use of the titanium dioxide prepared as in any of claims 1 to 9 as a photocatalyst in the decomposition of organic compounds or microorganisms.

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15. Use of the titanium dioxide prepared as in any of claims 1 to 9 as a photocatalyst in a coating composition.